| FlyBy Math™ Alignment<br>**Core Curriculum Content Standards for<br>Mathematics** |
|---|

## STANDARD 4.1 NUMBER AND NUMERICAL OPERATIONS
All students will develop number sense and will perform standard numerical operations and estimations on all types of numbers in a variety of ways.

### Strand 4.1.6 A. Number Sense

| Cumulative Progress Indicators | FlyBy Math™ Activities |
|---|---|
| 4. Explore the use of ratios and proportions in a variety of situations. | --Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates.<br><br>--Represent distance, speed, and time relationship for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system. |

### Strand 4.1.6 C. Estimation

| Cumulative Progress Indicators | FlyBy Math™ Activities |
|---|---|
| 3. Determine the reasonableness of an answer by estimating the result of operations. | --Predict outcomes and explain results of mathematical models and experiments. |

## STANDARD 4.2 GEOMETRY AND MEASUREMENT
All students will develop spatial sense and the ability to use geometric properties, relationships, and measurement to model, describe and analyze phenomena.

### Strand 4.2.6 D. Units of Measurement

| Cumulative Progress Indicators | FlyBy Math™ Activities |
|---|---|
| 5. Use measurements and estimates to describe and compare phenomena. | --Calculate and measure the position and time of simulated aircraft. Represent that motion using tables, graphs, equations, and experimentation. |

## STANDARD 4.3 PATTERNS AND ALGEBRA
All students will represent and analyze relationships among variable quantities and solve problems involving patterns, functions, and algebraic concepts and processes.

### Strand 4.3.6 C. Modeling

| Cumulative Progress Indicators | FlyBy Math™ Activities |
|---|---|
| 1. Use patterns, relations, and linear functions to model situations.<br>   • Using variables to represent unknown quantities<br>   • Using concrete materials, tables, graphs, verbal | --Represent distance, speed, and time relationship for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system. |

| | --Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes. |
|---|---|
| rules, algebraic expressions/equations/ inequalities | |
| 2. Draw freehand sketches of graphs that model real phenomena and use such graphs to predict and interpret events. <br>• Changes over time <br>• Relations between quantities <br>• Rates of change (e.g., when is plant growing slowly/rapidly, when is temperature dropping most rapidly/slowly) | --Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes. <br><br>--Represent distance, speed, and time relationship for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system. <br><br>--Use graphs to compare airspace scenarios for both the same and different starting conditions and the same and different constant (fixed) rates. |

## STANDARD 4.4 DATA ANALYSIS, PROBABILITY, AND DISCRETE MATHEMATICS

All students will develop an understanding of the concepts and techniques of data analysis, probability, and discrete mathematics, and will use them to model situations, solve problems, and analyze and draw appropriate inferences from data.

### Strand 4.4.6 A. Data Analysis

| Cumulative Progress Indicators | *FlyBy Math*<sup>TM</sup> Activities |
|---|---|
| 1. Collect, generate, organize, and display data. <br>• Data generated from surveys | --Conduct simulation and measurement for several aircraft conflict problems. <br><br>--Represent distance, rate, and time data using tables, line plots, bar graphs, and line graphs. |
| 2. Read, interpret, select, construct, analyze, generate questions about, and draw inferences from displays of data. <br>• Bar graph, line graph, circle graph, table <br>• Range, median, and mean <br>• Calculators and computers used to record and process information | --Choose among tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes. <br><br>--Use tables, bar graphs, line graphs, equations, and a Cartesian coordinate system to draw conclusions. |
| 3. Respond to questions about data and generate their own questions and hypotheses, and formulate strategies for answering their questions and testing their hypotheses. | --Use tables, bar graphs, line graphs, equations, and a Cartesian coordinate system to draw conclusions. <br><br>--Predict outcomes and explain results of mathematical models and experiments. <br><br>--Conduct simulation and measurement for several aircraft conflict problems. |

## STANDARD 4.5 MATHEMATICAL PROCESSES
All students will use mathematical processes of problem solving, communication, connections, reasoning, representations, and technology to solve problems and communicate mathematical ideas.

### Strand 4.5 A. Problem Solving

| Cumulative Progress Indicators | *FlyBy Math*™ Activities |
| --- | --- |
| 1. Learn mathematics through problem solving, inquiry, and discovery. | --Conduct simulation and measurement for several aircraft conflict problems.<br><br>--Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios. |
| 2. Solve problems that arise in mathematics and in other contexts.<br>• Open-ended problems<br>• Non-routine problems<br>• Problems with multiple solutions<br>• Problems that can be solved in several ways | --Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios<br><br>--Use tables, graphs, and equations to solve aircraft conflict problems. |
| 3. Select and apply a variety of appropriate problem-solving strategies (e.g., "try a simpler problem" or "make a diagram") to solve problems. | --Use tables, graphs, and equations to solve aircraft conflict problems. |
| 5. Monitor their progress and reflect on the process of their problem solving activity. | --Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system. |

### Strand 4.5 B. Communication

| Cumulative Progress Indicators | *FlyBy Math*™ Activities |
| --- | --- |
| 2. Communicate mathematical thinking coherently and clearly to peers, teachers, and others, both orally and in writing. | --Predict outcomes and explain results of mathematical models and experiments.<br><br>--Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system. |
| 4. Use the language of mathematics to express mathematical ideas precisely. | --Explain and justify solutions regarding the motion of two airplanes using the results of plotting points on a schematic of a jet route, on a vertical line graph, and on a Cartesian coordinate system.<br><br>--Predict outcomes and explain results of mathematical models and experiments. |

### Strand 4.5 C. Connections

| Cumulative Progress Indicators | *FlyBy Math*™ Activities |
| --- | --- |
| 3. Recognize that mathematics is used in a variety of contexts outside of mathematics. | --Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios. |

| | |
|---|---|
| 4. Apply mathematics in practical situations and in other disciplines. | --Apply mathematics to solving distance, rate, and time problems for aircraft conflict scenarios. |

## Strand 4.5 E. Representations

| Cumulative Progress Indicators | *FlyBy Math*TM **Activities** |
|---|---|
| 1. Create and use representations to organize, record, and communicate mathematical ideas.<br>• Pictorial representations (e.g., diagrams, charts, or tables)<br>• Symbolic representations (e.g., a formula)<br>• Graphical representations (e.g., a line graph) | --Represent distance, speed, and time relationship for constant speed cases using tables, bar graphs, line graphs, equations, and a Cartesian coordinate system. |
| 2. Select, apply, and translate among mathematical representations to solve problems. | --Choose among tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes. |
| 3. Use representations to model and interpret physical, social, and mathematical phenomena. | --Use tables, bar graphs, line graphs, a Cartesian coordinate system, and equations to model aircraft conflicts and predict outcomes. |